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THESIS

A STUDY OF PROMOTION TO MAJOR IN THE MARINE CORPS

by

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June 1996

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A STUDY OF PROMOTION TO MAJOR IN THE MARINE CORPS

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ABSTRACT

This study identifies factors related to a Marine Corps officer's selection for promotion to major. The focus is on differences in promotion between racial/ethnic groups and between men and women. In addition, data analyses seek to determine the relationship between selected variables--including measures of performance and priority (precept-stated) occupational specialties--and an individual's probability of promotion. The thesis estimates the independent effects of demographic factors, performance, and precepts using multivariate regression models. The estimates are obtained using maximum likelihood techniques. The results of the analysis indicate that personal decorations and performance evaluations are the most important determinants of an individual's probability of promotion, and that being black or female does not statistically affect the promotion outcome.

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I. INTRODUCTION

A. BACKGROUND

Currently, there is a considerable amount of attention directed toward the status and representation of minorities in the military. Particular attention has been focused on racial and ethnic minorities and women. Studies have investigated the status of minorities and women in the military from different perspectives, and have generally concentrated on accession, promotion, and retention. Accession policy has been directly dealt with by equal opportunity regulations (affirmative action). For example, Table 1 shows the officer accession goals used by the Marine Corps from fiscal years 1991 through 1993.

Table 1. Marine Corps Officer Accession Goals (in Percent), Fiscal Years 1991-1993

Race or Gender	1991	1992	1993
White	87.5	86.7	86.6
Black	6.5	6.7	6.6
Female	3.8	3.7	5.8

Source: Ref. 4: p. 39.

Promotion and retention policy have not been mandated by affirmative action programs. Many assume there may be a bias in the Marine Corps' selection for officer promotion because of differences in selection rates by demographic group. Specifically, selection rates have been lower for racial/ethnic minorities and women. Table 2 provides selection rates to major, by race and gender, for officers considered initially in fiscal years 1991 through 1993.

Table 2. Selection Rates to Major (in Percent), Fiscal Years 1991 -1993

Race or Gender	1991	1992	1993
Overall Average	64.9	65.9	66.1
White	66.4	66.5	67.2
Black	48.8	54.5	43.8
Female	57.1	56.0	59.6

Source: Ref. 4: p. 39.

However, looking at these rates alone fails to provide an overall picture of the selection process. For example, the rates alone do not reflect how minority accession goals affect selection or the Marine Corps' position that the "best" qualified officers, regardless of minority status, are selected for promotion. For this reason, it is important to use appropriate statistical methodology in an attempt to determine significant factors in the promotion process.

B. PURPOSE OF THE STUDY

This study focuses on promotion to Major (O-4) in the Marine Corps during two fiscal years, 1994 and 1995. The scope of the study is limited to data on the promotion boards for only two years due to data availability from the Marine Corps. There is limited information on retention in the analysis of promotion to major, since the data are keyed on the fiscal year promotion boards. In spite of the fact that this study is limited to only the two available years (and therefore may not be generalizable to the determinants of promotion to major for other fiscal years or other ranks), it does provide an empirical analysis of individual demographic and background characteristics in explaining promotion. These include minority status and

evaluated performance. Other determinants of promotion that are considered include higher education, reserve status, having dependents, promotion zone classification, and having an MOS mentioned in the board precept. No prior study has included information on the board precepts in an analysis of promotion.

C. ORGANIZATION OF THE STUDY

Chapter II provides a review of current literature and related research on promotion to major in the Marine Corps. Chapter III summarizes the data used in this study and describes the methodology for the empirical analysis. Chapters IV and V discuss the results of the empirical analysis and regression models, respectively. Chapter VI then concludes with a discussion of the study findings and recommendations. Supporting information is provided in Appendices A and B.

II. LITERATURE REVIEW

The following is a review of literature concerning minority status and success in the military. These studies have been completed in recent years and are directly related to Marine Corps promotions to major.

A. STUDY BY LONG

A Naval Postgraduate School thesis, written by Peter F. Long in 1992, focused on factors that affected Marine Corps officer promotion to the ranks of major, lieutenant colonel, and colonel [Ref. 1]. Specifically, Long looked at factors that could be used for estimating or predicting an individual officer's selection for promotion without knowledge or use of the individual's fitness reports. These factors were:

1. marital status,
2. attendance at an appropriate-level professional school, and
3. attainment of a postgraduate degree.

One of the most important results of Long's investigation is that specific factors were found to have no effect on selection for promotion. In particular, race, sex, and combat experience were insignificant in explaining promotion. Long does mention the reason for excluding fitness report data as it pertains to performance:

> Data for this analysis had to be available and obtainable from existing USMC data bases, and it had to adequately describe the officer in the primary zone. Ideally, performance data would be used to determine selection rates, but gathering data of that source would be time prohibitive. It would involve

gaining access to individual Master Brief Sheets, qualifying each Fitness Report Section B mark, and identifying certain key words and phrases as positive or negative, and assigning a value to the number and quality of the narrative in the Fitness Report. I ignored performance in this analysis and concentrated on variables that could be more readily made available. We will see, however, that performance is a basis for a number of the variables chosen for the models. [Ref. 1: p. 6]

Long found that the selection rate to major was 65.55 percent for the seven-year period he evaluated, fiscal years 1986 through 1992. Table 3 shows the selection rates associated with various individual background characteristics, as determined by Long.

Table 3. Selection Rates For Major in Long's Study

Variable	Categories	Selection Rate (Percent)
Race	White	66.05
	Nonwhite	58.84
Sex	Male	65.90
	Female	57.39
Education Level	Advanced	70.02
	Undergrad	64.45
Occupational Field	Combat Arms	63.27
	Fix wing	54.39
	Rtry Wing	68.02
	NFO	67.15
	Support	66.47
Duty Station	FMF	63.13
	Non-FMF	66.45
	HQMC	67.62
	Recruiting	79.71
	Quantico	62.20
General Classification Test (GCT)	High	66.95
	Low	63.23

Variable	Categories	Selection Rate (Percent)
Marital Status	Married	67.38
	Single	54.27
Combat	Yes	59.34
	No	65.92
Source of Entry	USNA	70.37
	ROTC	60.82
	OCS	65.95
Medals	Two or more	84.00
	Less than two	62.76
Appropriate Level School	Yes	82.55
	No	63.40

Source: Ref. 1: p. 17.

Most of the officers in Long's population were white. Black officers made up just under 4 percent and "others" (other racial groups) made up about 2 percent of his sample. Therefore, Long used only two categories for his sample: "white" and "nonwhite." "White" referred to all Caucasian officers and "nonwhite" referred to all others. For the education variables, "advanced" refers to all officers with a master's or higher degree. "Undergrad" designates all those with a bachelor's degree only. Military occupational specialties (MOSs) were collected in variables under the category of occupational field. These variables gathered all officers with an occupationally similar MOS. Long felt that all Marine Corps MOSs could be grouped into five types: combat, fixed wing, rotary wing, NFO, and support. His reason for examining occupational specialty involved possible differences in the selection rate by MOS each year:

> The Marine Corps lists over 40 individual primary MOSs that officers hold. Individual MOSs were analyzed just as were duty stations, with the same results. Annual variations based on the needs of the Marine Corps caused some MOSs to be selected at an above average rate one year, and below average other years. I combined the PMOSs into 5 categories, based on major type of specialty: [Ref. 1: p. 13]

Each of the occupational variables are further defined in Table 4.

Table 4. Occupational Field Variables Defined in the Long Study

Variable	Definition	MOSs Included
Combat Arms	Combat Arms	Infantry, Artillery, Tanks, Tracked Vehicles
Fix Wing	Fixed Wing Pilot	F-18, AV-8, A-6, C-130, C-9, A-4, F-4
Rtry Wing	Rotary Wing Pilot	CH-46, CH-53, UH-1, AH-1 Helo Pilots
NFO	Naval Flight Officer	Non-Pilot Cockpit Crew
Support	Support	Any other MOS not specifically assigned above.

Source: Ref. 1: p. 14.

Definitions of variables assigned the category of "duty station" by Long are presented in Table 5. The variables included the Fleet Marine Force, the Non-Fleet Marine Force, Headquarters Marine Corps, and the Marine Corps base at Quantico, Virginia.

Table 5. Variables for Duty Station in the Long Study

Variable	Definition	MOSs Included
FMF	Fleet Marine Force	All officers assigned to an FMF unit. This unit is primarily combat oriented and made up of three MEF units.
Non-FMF	Non-Fleet Marine Force	Includes all officers in the following commands and not listed in any of the other variables of this category: Marine Corps, Security Forces, overseas headquarters, Marine Corps Base support positions, and Recruit Depots.
HQMC	Headquarters Marine Corps	Officers assigned to HQMC in Arlington, VA.
Recruiting	Recruiting Duty	All officers assigned to a recruiting office.
Quantico	Marine Corps Base Quantico, VA	All officers assigned to a unit at the Marine Corps Base in Quantico.

Source: Ref. 1: p. 14.

Long uses two classifications, "high" and "low," to describe scores on the General Classification Test (GCT), which is taken by all officers in the Marine Corps just after commissioning. This test is used to evaluate math, reading, and reasoning skills. The variables Long uses are defined as follows: "high" includes all officers with a score greater than or equal to 125; and "low" includes all officers with a score less than 125. The maximum score possible on the GCT is 160.

The variable "single" includes all officers who were not married. The "yes" or "no" variable for the combat category indicates whether or not an officer had served in combat. The three commissioning sources used by Long are described in Table 6.

Table 6. Source of Entry Variables in the Long Study

Variable	Definition	Notes
USNA	United States Naval Academy	All officers who attended USNA for college.
ROTC	Recruit Officer Training Corps	All officers who belonged to the ROTC when in college.
OCS	Officer Candidate School	All officers who were not assigned one of the top two variables.

Source: Ref. 1: pp. 10, 15.

The variables (two or more and less than two) for the category "medals" was simply an indicator for the number of personal awards an officer had received. The "appropriate-level school" variable listed in Table 3 was defined according to whether or not an officer attended an appropriate-level professional school. These schools are numerous and vary by MOS. Examples of schools include Advanced Infantry, Artillery, and Armor.

The selection rate for major was 65.55 percent for the entire seven-year period, from fiscal years 1986 through 1992. Each of the above variables was then included in Long's regression model of promotion to major. The following is his description of how these models were developed:

> The promotion models were developed using a log-linear stepwise regression in CSS Statistical software to determine main effects and interaction effects between variables on the response of selected or not selected for promotion. Once the models were developed, a maximum likelihood statistic was noted, a relevant p-value determined and the model then put into the S+ software to determine coefficients for each main effect and interaction effect. The modern parameterization technique is used by this software. That is, one level of each factor is used for reference and its coefficient is taken as zero. A backwards stepwise regression (logistic regression) was executed for each paygrade using

the variables up to and including all three way interactions (CSS Statistical showed no pertinent four way interactions), and the following models were generated: [Ref. 1:p. 23]

The results for Long's model of promotion to major are shown in Table 7.

Table 7. Results of Long's Model of Promotion to Major

Variable	Coefficient	t-Value
Married	0.54	5.86
ALS Attended	1.01	7.88
Advanced Degree	0.22	2.58
USNA Graduate	0.13	2.06
ROTC Graduate	-0.16	-4.49
Medals >2	1.05	6.59
USNA and Medals 2	-0.36	-1.96
ROTC and Medals 2	0.33	2.83

Source: Ref. 1: p. 26.

As seen in Table 7, factors that have a positive effect on selection are:

1. being married;
2. attending an Appropriate Level School (ALS);
3. having an Advanced Degree;
4. graduating from the US Naval Academy (USNA); and
5. having 2 or more personal decorations (medals).

In addition, he found that race and gender were not statistically significant.

B. STUDY BY HAMM

Another study (also a Naval Postgraduate School thesis), by J. J. Hamm, analyzed factors that predicted the success of Marine Corps officers at three stages: The Basic School (TBS), promotion to captain, and promotion to major. [Ref. 3] The factors that were significant for all three stages include:

1. commissioning source;
2. GCT score; and
3. composite standing at TBS.

An important result in Hamm's study is the fact that success in each of the three stages was not associated with race. Specifically, the author found that "selection rates to major did not differ significantly by race." [Ref. 3: p. x]

The following factors were statistically significant in selection for promotion to major:

1. year of attendance at TBS;
2. GCT score;
3. composite third at TBS;
4. attendance at Amphibious Warfare School (AWS); and
5. completion of the Command and Staff nonresident course.

Number (3), above, is an indication of where an officer's completion score was at TBS. The entire range of possible scores was split into thirds (top 1/3, middle 1/3, and bottom 1/3). But, again, selection was not affected by racial group.

Hamm addressed the numerous internal and external evaluations of Marine Corps minority officers. He states:

> Issues of minority officer recruitment, retention, and promotion have also generated much public discussion in the military press. Many feel that the promotion and retention disparities suffered by minority officers are not caused by racial bias. But, rather, they are linked to difficulties associated with procuring minority officer candidates with sufficient entry level skills to enable them to successfully compete with their peers. [Ref. 3: p. 2]

Hamm points out that the accession of low-quality minority officers affects the percentage of minority officers in higher pay grades (major, lieutenant, and colonel). The term "low-quality" here simply indicates individual officers who scored low on initial tests and training near the beginning of their Marine Corps career. In essence, he states that a decrease in the ability of officers at accession may cause a decrease in their selection for promotion to major and above.

Hamm's study addressed reasons for the low number of black officers in the higher pay grades. His discussion focused on the following issues:

1. accession,
2. retention,
3. promotion, and
4. professional development.

With respect to accessions, Hamm states that "relatively small numbers of college age Blacks actually graduate from college and [this] is a major factor which affects the eligible

population, and thus, Black officer accessions." [Ref. 3: p. 4] For retention, he discusses how a large number of black officers voluntarily separate from military service because of their education, skill, and demand by the civilian sector. "Inequalities in promotion rates by race and gender have been a concern of all the military services in recent years." [Ref. 2: p. 7] While specific racial bias has not been determined in several studies, black men have had lower promotion rates than other groups. And concerning professional development, Hamm explains that blacks have not performed as well as whites on educational measurement tests for officer selection (SAT, ACT, and ASVAB EL) or at TBS, and this has affected their survivorship in the Marine Corps.

C. STUDY BY HARRINGTON

These particular points were also discussed by Marine Captain Daniel F. Harrington in a 1993 article in the *Marine Corps Gazette* [Ref. 4]. Harrington explains what he calls the "Accession/Selection Paradox" and why "minorities and women have enjoyed a less than average selection (to major) percentage." [Ref. 4: p. 38] Specifically, he states that there are goals, quotas, or requirements for the accession of certain officers but not for their promotion. First, he points out that, in fiscal years 1991-1993, minorities and women had a below-average selection rate. These rates are shown in Table 8.

Table 8. USMC Major Selection Rates, Fiscal Years 1991-1993

Group	1991	1992	1993
USMC Average	64.9	65.9	66.1
Minority	50.6	56.3	53.1
Female	57.1	56.0	59.6

Source: Ref. 4.

Harrington then states that "while these statistics lend a degree of credibility to the general indictment (of bias), they do not reveal the larger picture, which has its beginnings in accession policy." [Ref. 4: p. 38] As for this policy, he addresses the accession goals for equal opportunity consideration and talks about the importance of the free market forces of supply and demand on the recruitment of officers in the Marine Corps. Specifically, he states that "the majority accession has an average, overall higher quality when compared to the minority accession." [Ref. 4: p. 39] He supports this point with data on the percentages of blacks and women qualifying for a commission in the Marine Corps with a Mental Aptitude Waiver (See Table 9).

Table 9. Percentage of USMC Officer Candidates Qualifying with a Mental Aptitude Waiver, Fiscal Years 1990-1992

Group	1990	1991	1992
White	8.2	6.7	6.0
Black	27.1	32.4	33.5
Female	12.2	14.1	14.1

Source: Ref. 4.

He also indicates that blacks and women scored lower on measured areas of performance at TBS.

Overall, Harrington states that accession targets are established by race and gender to meet equal opportunity goals, and that mental aptitude waivers are used to meet these goals. [Ref. 4: p. 39] Minorities and women have a larger percentage of waivers than white men. Officers with a waiver usually graduate in the lower third of TBS. Also, minorities and women have a lower-than-average selection rate for promotion to major. Harrington's recommendation is to eliminate the use of mental aptitude waivers and continue to maintain equal opportunity goals by accessing officer candidates from the enlisted force (through the Marine Enlisted Commissioning Education Program, Enlisted Commissioning Program, and Naval Reserve Officer Training Corps).

D. STUDY BY ESTRIDGE

Another Naval Postgraduate School thesis on officer promotion in the USMC was written by Major David Estridge in 1995. [Ref. 2] This thesis analyzed certain personal and professional background characteristics and their effect on selection for major and lieutenant colonel in the Marine Corps during fiscal years 1993 and 1994. The primary focus of Estridge's thesis was the effect on promotion of graduating from the Naval Postgraduate School (NPS). Results of Estridge's analysis include a higher probability of selection to major for the following background factors:

1. augmentation into the regular Marine Corps;
2. being in a pilot MOS;

3. graduating from the Naval Academy;

4. having personal decorations;

5. graduating from NPS; and

6. having an above-average performance index (PI).

Although there are several methods of determining a Performance Index for Marine Corps officers, Estridge used the following method:

> A straight performance index for each officer was computed by assigning numerical scores to each of the observed performance blocks and qualities blocks on the Master Brief Sheet (MBS). Values were assigned as follows:
>
> 1 = unsatisfactory
> 2 = below average
> 3 = average
> 4 = excellent
> 5 = outstanding
>
> All observed values in the performance blocks were summed then divided by the number of observed marks. The same formula was used to compute the qualities portion of the MBS. These two values were then added together giving each officer a performance index on a scaled ranging from 1 to 12. [Ref. 5: p. 13]

The Master Brief Sheet (MBS) for a Marine Corps officer includes a consolidation of section B from all previous fitness reports. (The MBS is reproduced in Appendix A.) Estridge developed and used this definition of PI to determine differences in individual performance. It is similar to the evaluation made by members of a promotion board. Selection for promotion in the Marine Corps is primarily based on the subjective judgment of board members and is not a quantitative calculation. Each member of a promotion board views the entire Fitness Report. (The Fitness Report is shown in Appendix B.) This report

includes narrative portions, and Sections C and D, which cannot be quantitatively evaluated. It is for this reason that a PI was calculated and used to measure the individual's performance prior to being reviewed for promotion. The computation of a PI in this thesis is similar to that used by Estridge.

E. SUMMARY: FOCUS ON PROMOTION TO MAJOR

Long's thesis at the Naval Postgraduate School considered non-fitness report information for estimating selection for promotion. His results indicate that race and sex were not statistically significant factors. He states that fitness report data were not obtainable for use in his study. However, fitness report data were available for the present thesis and a portion of it (Section B) is quantifiable with the Performance Index developed by David Estridge. Long indicates that the selection rate to major was 65.55 percent for the seven-year period (1986-1992) he evaluated. For minorities, the selection rate was 58.84 percent; and, for women, it was 57.39 percent.

Hamm's thesis at the Naval Postgraduate School analyzed success of individuals at three stages in the Marine Corps, including promotion to major. He indicates that, while there were reports of a lower percentage of minority officers selected for promotion to major in the Marine Corps, selection was not statistically affected by race in his analysis from 1980 to 1991. However, he does discuss why a lower percentage of minority officers was selected for promotion.

Harrington observes that minorities, as well as women officers, had a below-average selection rate to major during the three-year period from 1991 through 1993. He also discusses the possible causes of these disparities. Much of his focus is on the fact there is

"equal opportunity" in the accession for Marine Corps officers, but not at selection for promotion. Yet, there are specific promotion "goals" at the boards studied in this thesis, which are discussed in the next chapter under "precepts."

The thesis by Estridge finds that the probability of selection to major is increased by the following factors:

1. augmentation into the regular Marine Corps;
2. having certain MOSs (pilot, combat, and service support);
3. graduation from the US Naval Academy;
4. high Performance Index;
5. personal awards; and
6. graduation from NPS.

Estridge also used a Performance Index to determine an individual's performance before the board. The results of his analysis show that race and gender were not statistically significant with respect to promotion to major.

In the studies reviewed here, several factors are found to have an effect on promotion to major in the Marine Corps. Many of these factors are also included as variables in the models used for the present study. Two of the more important factors frequently mentioned in the literature are race and gender. In addition, education, personal awards, dependents, service component, and performance have also been considered. Two other areas are similarly examined in this thesis. They are the MOSs mentioned in the precept of the

convening promotion board and the promotion zone. No previous research has attempted to incorporate board precepts in analyzing promotion to major.

III. METHODOLOGY AND DATA

A. METHODOLOGY

Table 10 shows the variables that were used in the empirical analysis. Although other variables were considered, these were the principal variables (all binary) examined in the empirical models.

Table 10. Description of Variables Used in the Study

Variable	Categories	Description
Selection	Selection	= 1 for officer selected for promotion
Race	White	= 1 for white officer
	Black	= 1 for black officer
	Others	= 1 for black officer
	Minority	= 1 for officer not white
Gender	Male	= 1 for male officer
	Female	= 1 for female officer
Education	Bach	= 1 for officer with only a bachelor's degree
	Gtbach	= 1 for officer with at least one personal decoration
	Noaward	= 1 for officer with no personal decoration
Precept	Precept	= 1 for officer with a PMOS listed in the precept
Dependents	Depn	= 1 for officer with one or more dependents
	Nodepn	= 1 for officer with no dependents
Zones	Above-Zone	= 1 for officer above-zone
	In-Zone	= 1 for officer in-zone

Variable	Categories	Description
Service Component	Regular	= 1 for officer classified as regular
	Reserve	= 1 for officer classified as reserve on active duty
Performance Index	Hipi	= 1 for officer with a performance index in the top 10%
	Medpi	= 1 for officer with a performance index less than top 10% and greater than bottom 50%
	Lowpi	= 1 for officer with a performance index in the bottom 50%

The performance index used in this study is similar to the one used by Estridge in a 1995 Master's thesis at the Naval Postgraduate School [Ref. 2]. The Performance Index was computed by calculating the performance marks given to each individual on his or her performance evaluation sheets (fitness reports). The range assigned to each individual was from 1 to 12. The purpose of this index is to simulate the basis by which promotion boards evaluate individuals for promotion. The hypothesis is that individuals with higher performance scores are more likely to be selected for promotion than those with lower scores. By including this variable in the multivariate model, we can examine the effect of demographic factors, such as race or gender, independent of prior performance. Note, too, that the major contribution of this thesis is the inclusion of the precepts variable in the model.

B. DATA

The data for this study include individual information on captains in the Marine Corps being considered for promotion to major during fiscal years 1994 and 1995. The total number of individual observations available for both years is 1,519 (633 for 1994 and 866 for 1995). The number of variables available for both years in the data file is 123. This information was

originally obtained from the Manpower Analysis Section at Headquarters, Marine Corps, and included individual information available to the promotion boards on each captain considered for promotion. This individual information was unclassified and focused on the person's demographic and background characteristics as well as evaluated performance.

The number of captains selected for promotion to major was 293 in fiscal year 1994 and 530 in fiscal year 1995. These numbers have been verified by telephone conversation with members assigned to Officer Promotions at Headquarters, Marine Corps. Individuals who are "below-zone" are not included in this study. Officers selected from this zone are few in number and their selection is not a part of the normal promotion process. In fact, no officers were selected from "below zone" in fiscal year 1994; and only two were selected in fiscal year 1995.

During the two years examined, as for most years, the unrestricted Marine Corps officer must have a Bachelor's degree to be commissioned. However, there are a few officers without a Bachelor's degree in the two years examined by this study. Because this is not the normal background for an officer, these few individuals without a Bachelor's degree were eliminated from the sample.

As with many data sets, some errors may take place in data entry. A specific problem could be a missing entry or incorrect entry for an individual on a particular variable. In the few cases where errors were found to occur, the individual observations were removed from the sample.

Research by Harrington (see Chapter II) indicated that there are no promotion goals for minorities similar to the goals for officer accessions. It may be of interest, then, to view portions of the "precepts" for promotion boards [Ref. 5, 6]. For the most part, precepts for Marine Corps promotion boards indicate how the board should be run. For promotion selection in fiscal years 1994 and 1995, the following information or guidance was provided. It is important to note that the 1994 board convened in February 1993 and it is often referred to elsewhere as the fiscal year 1994 Major Selection Board. Similarly, the fiscal year 1995 Major Selection Board met in February 1994.

From looking at the precepts, which identify members of the board, and talking to individuals involved, it appears that board members included a female officer, a reserve officer, air and ground MOS officers, and a black officer.

The precepts of both boards state that officers selected for promotion will be chosen by the majority of board members who feel the individual is best and fully qualified for promotion. Also, each board is given the exact number that may be selected. In 1994, the number of promotions was set at 299; and, in 1995, it was 550. Also, the number who could be selected "below-zone" was given. In 1994, the "below-zone" selectees could total no more than 29; and, in 1995, the limit was 55. Each board was also told in the precepts to specifically "give appropriate consideration" to individuals with particular military occupational skills (MOSs), as shown in Tables 11 and 12. Based on conversations with members of the officer promotion section, the MOSs mentioned in the precepts are short of officers due to vacancies. However, board members are still required to pick the best and

fully-qualified officers, regardless of MOS. Thus, it is an empirical question of whether an independent effect of the precept on promotion can be observed in the data.

Table 11. Fiscal Year 1994 Precept MOSs

MOS Number	Specialty
0202	Intelligence
0402	Logistics
2602	Signals Intelligence
3502	Motor Transport
4002	Data Systems
5803	Military Police
7208	Air Support Control
7509	Pilot AV-8B
7527	Pilot F/A-18D
7543	Pilot EA-6A/B
7557	Pilot KC-130
7588	EA-6A/B EWO

Source: Ref. 5: p. 2.

Table 12. Fiscal Year 1995 Precept MOSs

MOS Number	Specialty
0202	Intelligence
0250	Communications
2602	Signals Intelligence/EW
3502	Motor Transport
4002	Data Systems
4302	Public Affairs
5803	Military Police
7210	Air Defense Control
7320	Air Traffic Control
7527	Pilot F/A-18F
7543	Pilot EA-6A/B

Source: Ref. 6: p. 2.

The following is also mentioned in the 1994 precept for promotion selection: "The board should give the appropriate consideration to the performance in joint duty assignments of officers who are serving or have served in such assignments." In addition, members were instructed to not consider information on an officer's attendance at the Tailhook Symposium unless it was officially placed before the board.

IV. RESULTS OF EMPIRICAL ANALYSIS OF PROMOTION TO O-4

A. FISCAL YEAR 1994 PROMOTION BOARD DATA

After sample restrictions were applied, the total number of observations analyzed for the fiscal year 1994 promotion to major board was 618. Of this number, 293 were selected by the promotion board for major--a selection rate of 47.1 percent. The numbers of observations within zones 1, 2, and 3 were 206, 412, and 0, respectively. Thus, there is no effect of eliminating officers in zone 3 "below zone" from the fiscal year 1994 sample.

Of the 618 officers, 26 (4.2 percent) were women. Table 13 provides a breakdown of the racial/ethnic distribution of all 618 observations. Table 10 above defined the variables used in the racial/ethnic group portion of Table 13.

Table 13. Number and Percentage Distribution of Officers by Racial/Ethnic Group in the Fiscal Year 1994 Sample

Racial/Ethnic Group	Number	Percent
White	582	94.2
Black	29	4.7
Others	7	1.1
Total	618	100.0

All of the 618 officers examined in this study had a Bachelor's degree, and 99 (or 16 percent) had an even higher degree. It is also noted that 64 (10.4 percent) of the observations

were classified as having no dependents and 14 (or 2.3 percent) were reservists on active duty.

This study focuses on the effect of the primary military occupational skills (PMOSs) stressed by the precepts on promotion. It was determined that 168 officers (27.2 percent) considered for promotion had a "precept" PMOS. In addition, 137 officers (22.2 percent) had no personal decorations.

Table 14 provides a breakdown of officers by the performance index. The performance index was calculated similar to the way it was done in a study by Estridge:

> A straight performance index for each officer was computed by assigning numerical scores to each of the observed performance blocks and qualities blocks on the Master Brief Sheet (MBS). All observed values in the performance blocks were summed then divided by the number of observed marks. The same formula was used to compute the qualities portion of the MBS. These two values were then added together giving each officer a performance index on a scale ranging from 1 to 12. [Ref. 2: p. 13]

Table 14. Number and Percentage Distribution of Officers by Performance Index Categories in Fiscal Year 1994 Sample

Performance Index (PI) Category	Number	Percent
High PI (top 10%)	60	9.7
Medium PI (11-50%)	256	41.4
Low PI (below 50%)	302	48.9
Total	618	100.0

Because one area of interest in the study concerns minority officers, several cross tabulations involving racial/ethnic groups and other variables were performed. These are presented in Table 15.

Table 15. Percentage of Officers With Selected Characteristics, by Racial/Ethnic Group, in Fiscal Year 1994 Sample

Racial/Ethnic Group	Selection Rate (Percent)	Greater Than a Bachelor's Degree (Percent)	Precept PMOS (Percent)	No Dependents (Percent)	Personal Award (Percent)
White	48.3	16.0	26.6	9.6	78.4
Black	27.6	17.2	34.5	24.1	69.0
Others	57.1	14.3	42.9	14.3	71.4
All	47.4	16.0	27.2	10.4	77.8

Table 15 shows that only 27.6 percent of all black officers were selected for promotion to major in fiscal year 1994, compared with a selection rate of 48.3 percent for white officers. The unadjusted difference in promotion rates between white officers and black officers is almost 21 percentage points. A higher proportion of black officers than white officers have a graduate degree, serve in a precept PMOS, and have no dependents. At the same time, there is a lower proportion of black officers than white officers with a personal decoration.

Table 16 shows the proportion of officers, by racial/ethnic group within each of the performance index categories.

Table 16. Percentage of Officers in Performance Index Categories, by Racial/Ethnic Group, in Fiscal Year 1994 Sample

Racial/Ethnic Group	High Performance Index (Percent)	Medium Performance Index (Percent)	Low Performance Index (Percent)
White	10.3	42.1	47.6
Black	0.0	24.1	75.9
Others	0.0	57.1	42.9
All	9.7	41.4	48.9

As seen in Table 16, no minority officers had a high performance index, whereas about 10 percent of white officers scored in the high category. At the same time, 24.1 percent of blacks and 57.1 percent of "others" scored in the medium range on the index, compared with 42.1 percent of whites. The vast majority of blacks (75.9 percent) scored in the lowest portion (bottom half) of the performance index. This compares with 47.6 percent of whites and 42.9 percent of "others" in the low range.

Table 17 provides the 1994 selection rate by gender. As seen in Table 17, the selection rate for female officers was nearly 7 percentage points higher than the rate for male officers.

Table 17. Selection Rate by Gender in Fiscal Year 1994 Sample

Gender	Selection Rate (Percent)
Male	47.1
Female	53.9

Table 18 tabulates the percentages of officers with a priority (precept-stated) PMOS who were promoted. As seen here, there is just a slight difference between the promotion rate of officers with and without a precept-PMOS.

Table 18. Selection Rate by Precept-PMOS in Fiscal Year 1994 Sample

Precept-PMOS	Selection Rate (Percent)
With	48.2
Without	47.1

B. FISCAL YEAR 1995 PROMOTION BOARD DATA

The total number of observations analyzed for the fiscal year 1995 promotion to major board is 857. Of this number, 530 (or 61.8 percent) were selected by the promotion board for major. The numbers of observations within zones 1, 2, and 3 were 93, 764, and 2, respectively. The two persons in zone 3 (below-zone) were not considered in this study. Sixteen of the 857 officers (1.9 percent) were women. Table 19 shows the racial/ethnic breakdown of the 857 observations.

Table 19. Number and Percentage Distribution of Officers by Racial/Ethnic Group in Fiscal Year 1995 Sample

Racial/Ethnic Group	Number	Percent
White	811	94.6
Black	30	3.5
Others	16	1.9
Total	857	100.0

Table 10 (see Chapter III) defines the variables used in the racial/ethnic group portion of Table 19. All of the 857 officers examined here had a Bachelor's degree; and 137 (16 percent) had a graduate degree. A total of 113 officers (13.2 percent) were classified as having no dependents; 52 (6.1 percent) were reservists on active duty; and 147 officers (17.2 percent) had a precept PMOS. In addition, 149 (17.4 percent) of the officers had no personal decorations. Table 20 shows the distribution of officers in the sample by their rating on the performance index.

Table 20. Number and Percentage Distribution of Officers by Performance Index Categories in Fiscal Year 1995 Sample

Performance Index (PI) Category	Number	Percent
High PI (top 10%)	80	9.3
Medium PI (11-50%)	348	40.6
Low PI (below 50%)	429	50.1
Total	857	100.0

Because one of the issues addressed in this study is the performance of minority officers, several cross tabulations were computed to determine the characteristics of officers by their racial/ethnic group. The results are depicted in Table 21.

Table 21. Percentage of Officers With Selected Characteristics, by Racial/Ethnic Group, in Fiscal Year 1995 Sample

Racial/Ethnic Group	Selection Rate (Percent)	Greater than a Bachelor's Degree (Percent)	Precept PMOS (Percent)	No Dependents (Percent)	Personal Award (Percent)
White	62.4	16.4	16.9	13.0	82.9
Black	53.3	6.7	26.7	20.0	80.0
Others	50.0	12.5	12.5	12.5	75.0
All	61.8	16.0	17.2	13.2	82.6

It can be seen in Table 21 that 53.3 percent of black officers were selected for promotion to major in fiscal year 1995, compared with 62.4 percent of white officers. This is a smaller percentage point difference between the two groups (9 points) than in 1994 (21 points).

The proportion of black officers with a graduate degree was noticeably lower in 1995 (6.7 percent) compared with 1994 (17.2 percent). Additionally, the percentage of precept PMOSs for all officers fell from 27.2 percent in 1994 to 17.2 percent in 1995; but the percentage point differed by racial/ethnic group, as the spread between blacks (26.7 percent)

and whites (16.9 percent) expanded slightly. The percentage point difference between blacks and whites with no dependent is similar in 1994 to that of the year before. In 1995, 20.0 percent of blacks had no dependent and 20 percent had no personal decorations.

The distribution of racial/ethnic groups by the performance index ratings is presented in Table 22.

Table 22. Percentage of Officers in Performance Index Categories, by Racial/Ethnic Group, in Fiscal Year 1995 Sample

Racial/Ethnic Group	High Performance Index (Percent)	Medium Performance Index (Percent)	Low Performance Index (Percent)
White	9.6	41.7	48.7
Black	3.3	16.7	80.0
Others	6.3	31.3	62.5
All	9.3	40.6	50.1

Approximately 3.3 percent of black officers in fiscal year 1995 had a high performance index, compared with 9.6 percent of white officers. Also, 16.7 percent of blacks were in the middle range, compared with 42 percent of whites. Again, the vast majority of blacks (80 percent) scored in the lowest portion (bottom half) of the index.

Table 23 shows the 1995 selection rate by gender. As seen here, the selection rate for female officers is about 13 percentage points higher than that for their male counterparts.

Table 23. Selection Rate by Gender in Fiscal Year 1995 Sample

Gender	Selection Rate (Percent)
Male	61.6
Female	75.0

Table 24 tabulates precept-PMOS by promotion for fiscal year 1995. Again, the difference in promotion rates by precept-PMOS was slight--only 4 percentage points.

Table 24. Selection Rate by Precept-PMOS in Fiscal Year 1995 Sample

Precept-PMOS	Selection Rate (Percent)
With	58.5
Without	62.5

C. HYPOTHESIZED EFFECTS OF EXPLANATORY VARIABLES

Because of the sizable differences in the unadjusted selection rates between blacks and whites (20 percentage points lower for blacks in fiscal year 1994 and 9 percentage points lower in 1995), it is hypothesized that minority status has a negative impact on being selected for promotion. While minorities other than blacks (OTHERS) are included in the model, the variable may have no effect, because the number of observations for this group is small (7 in 1994 and 16 in 1995). This may also be the case with the small number of FEMALES (26 in 1994 and 16 in 1995). It is hypothesized that officers with a graduate degree or a personal decoration are more likely to be selected for promotion in the bivariate analysis. Because of

the competition required for augmentation to a regular commission, being in the reserves on active duty may decrease selection for promotion. There is no *a priori* reason to believe that having (or not having) dependents affects selection. An initial hypothesis is that having one of the MOSs mentioned in the precepts may increase an individual's chance of selection. Being passed for promotion once "above-zone" may well mean there is a greater probability of being passed or not selected for promotion again. Therefore, it is assumed that being "in-zone" will increase an officer's odds of selection. It is also believed that the higher the Performance Index (PI), the higher the probability for promotion. These hypotheses are explored in Chapter V.

V. REGRESSION RESULTS

This study uses binomial logit models to estimate the factors that are significant determinants of promotion to major in the Marine Corps. The specific goals are to determine whether race or gender are significant independent explanatory factors, and whether the precept-PMOS has a significant effect on promotion. Based on the binary variables presented above, a logistic regression model was specified for both fiscal year 1994 and fiscal year 1995 promotion selection boards. Table 25 provides the results of estimating the logit models for both years using maximum likelihood techniques.

The BLACK and OTHER variables are used to determine if race is a statistically significant factor in the promotion process. Explanatory variables such as GTBACH, AWARD, and DEP have been considered by other studies and are also included in the model. Because competition is used by those with a reserve commission to become a regular officer, similar to promotion, it is also included. At the time, during fiscal years 1994 and 1995, most Marine Corps officers were commissioned in the reserves on active duty. They were then required to compete for augmentation into the regular service. Augmentation of an officer prior to consideration for promotion to major was based on competition similar to that required for selection to major. The PRECEPT-MOS variable is in the model because these MOSs are stressed at each promotion board. PI is used as a measure of prior performance in the Marine Corps.

Table 25. Promotion to Major Multivariate Regression Model Results for Fiscal Years 1994 and 1995

Variable	Fiscal 1994		Fiscal 1995	
	Parameter Estimate	Wald Chi-Square	Parameter Estimate	Wald Chi-Square
Intercept	-1.3328	34.2450	-0.5218	5.7853
Black	-0.1826	0.3099	0.2271	0.7580
Others	0.2229	0.1574	-0.1387	0.1571
Female	0.7755	5.1648	0.4971	1.5579
Gtbach	0.2456	1.8851	0.0255	0.0348
Award	0.5947	12.3256	0.6725	26.0225
Reserve	-0.2801	0.4440	0.0920	0.2033
Precept	0.0287	0.0395	-0.0009	0.0000
Nodepn	0.2301	1.1917	-0.1989	1.8280
Inzone	1.5278	85.5930	0.9938	30.6849
Hipi	0.9186	9.3286	0.5328	4.4928
Lowpi	-1.0404	61.0544	-1.1647	118.4196

The information in Table 26 is provided to indicate the goodness-of-fit of the models used.

The chi-square values for the log likelihoods are highly significant.

Table 26. Assessing Model Fit

Fiscal Year	Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
1994	-2 LOG L	855.072	502.962	352.110 with 11 DP (p=0.0001)
1995	-2 LOG L	1139.51	841.735	297.774 with 11 DP (p=0.0001)

The purpose of both models is to determine which explanatory variables are significant in explaining promotion to O-4. The results of running these models found four of the variables to be significant in both years. They were:

AWARD all officers with at least one personal decorations

IN-ZONE all officers considered for the first time

HIPI all officers with a PI in the top 10%

LOWPI all officers with a PI in the bottom 50%

To determine the change in the probability of selection for each of the significant variables, the following formula [Ref. 7: p. 488] was used:

PARAMETER ESTIMATE X (1 - SELECTION RATE) X SELECTION RATE

Table 27 shows the percentage point change found for each of the four significant variables in 1995--AWARD, IN-ZONE, HIPI, AND LOWPI (Column 2):

Table 27. Percentage Point Change for the Significant Variables in Models for Fiscal Years 1994 and 1995

Variable	Fiscal 1994	Fiscal 1995
Award	14.80	15.90
In-Zone	38.10	23.50
Hipi	22.30	12.60
Lowpi	-25.90	-27.50
Female	19.34	N/A

As Table 27 shows, the largest effect was obtained for the "in-zone" variable in the fiscal year 1994 model. However, the performance index variables both had relatively large effects in the 1994 model. One performance index (low PI) had the largest (negative) relative effect in 1995. In addition, the FEMALE variable was significant only in fiscal year 1994. The number of women in the Marine Corps is small and the FEMALE variable was not significant in fiscal year 1995. There were no significant differences in selection rates for the following variables in both years:

BLACK and WHITE

RESERVE and REGULAR

PRECEPT and NON-PRECEPT

NODEPN and DEPENDENTS

The same promotion models are reestimated in Table 28, but with the in-zone variable omitted. This was done to determine how sensitive the parameter estimates are to inclusion of the in-zone variable.

Table 28. Promotion to Major Model Without INZONE Variable for Fiscal Years 1994 - 1995

Variable	Fiscal 1994		Fiscal 1995	
	Parameter Estimate	WALD Chi-Square	Parameter Estimate	WALD Chi-Square
Intercept	-0.1377	0.7151	0.3929	8.5155
Black	-0.2201	0.5877	0.1879	0.5436
Others	0.2737	0.2698	-0.1127	0.1040
Female	0.4628	2.4387	0.6053	2.2465
Gtbach	0.1643	1.0097	0.0224	0.0278
Award	0.6648	19.2280	0.7111	31.2653
Reserve	-0.1548	0.1445	0.1515	0.5637
Precept	0.1215	0.8403	-0.0116	0.0081
Nodepn	0.1548	0.6578	-0.1621	1.2481
Hipi	1.0923	14.4332	0.5711	5.1698
Lowpi	-1.3055	117.2256	-1.2721	147.9304

Table 29 provides information that indicates the goodness-of-fit of the models used. Again, the chi-square values are highly significant.

Table 29. Assessing Model Fit

Fiscal Year	Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
1994	-2 LOG L	855.072	607.61	2 47.459 with 10 DF (p = 0.0001)
1995	-2 LOG L	1139.509	876.461	263.048 with 10 DF (p = 0.00010

Results of running the regression models without the INZONE variable does not consider which promotion zone (in or above) an individual is in. When the INZONE variable is included in the model, it shows that being looked at for the first time by the fiscal year 1994 and 1995 major selection boards dramatically increased the odds of selection (38 percentage points) over those being considered for the second time. Based on Wald Chi-Square, when INZONE is omitted, the same variables were significant as in the previous model. One difference is that the FEMALE variable becomes insignificant in both years when the INZONE is omitted. Also, the percentage point effect of AWARD, HIPI and LOW PI increase considerably, as shown in Table 30.

Table 30. Percentage Point Change for the Four Significant Variables in Model Without the INZONE, Fiscal Years 1994 and 1995

Variable	Fiscal 1994	Fiscal 1995
Award	16.58	16.78
Hipi	27.73	13.48
Lowpi	-32.55	-30.02

Table 31 summarizes the hypothesized and estimated sign for each explanatory variable by the fiscal year 1994 and 1995 promotion boards.

Table 31. Prediction and Results from Models

Variable	Hypothesized Sign	Estimated Sign	
		FY94	FY95
Blacks	-	NS	NS
Others	?	NS	NS
Females	?	+	NS
Gtbach	+	NS	NS
Award	+	+	+
Reserve	-	NS	NS
Nodepn	?	NS	NS
Precept	+	NS	NS
In-Zone	+	+	+
Hipi	+	+	+
Lowpi	-	-	-

Legend: + indicates an increase in the probability of selection to major.
- indicates a decrease in the probability of selection.
? indicates probability unknown.
NS indicates not statistically significant.

For the models, being black, having a reserve commission, and having a precept MOS had no significant effect on promotion. This may be because PI is held constant. The increase in the probability of selection for women is significant only in fiscal year 1994. However, this may not be an important finding because of the low number of women in the sample. The female variable was not significant in fiscal year 1995.

To determine whether the correlation between minority status and the performance index (see Table 22) biases the coefficient of the minority variables, the promotion models are reestimated after omitting the PI variables. The results, shown in Table 32, indicate that the coefficients of BLACK and OTHERS increase in size, but they remain statistically insignificant. However, the relative effect of INZONE increases considerably, as shown in Table 33.

Table 32. Promotion Results Omitting the Performance Index for Fiscal Years 1994 - 1995

Variable	Fiscal 1994		Fiscal 1995	
	Parameter Estimate	WALD Chi-Square	Parameter Estimates	WALD Chi-Square
Intercept	-2.1131	109.7419	-1.4824	60.6195
Black	-0.4633	2.1402	-0.0982	0.1506
Others	0.3036	0.2749	-0.3166	0.9325
Female	0.5981	3.4431	0.4166	1.3350
Gtbach	0.3289	4.0126	-0.0016	0.0002
Award	-0.4654	1.2450	-0.1576	0.6877
Precept	-0.0561	0.1775	-0.1514	1.5293
Nodepn	0.2396	1.3982	-0.2715	3.9195

Variable	Fiscal 1994		Fiscal 1995	
	Parameter Estimate	WALD Chi-Square	Parameter Estimates	WALD Chi-Square
Inzone	1.8552	147.6492	1.3728	66.1468

Table 33. Percentage Point change for Significant Variables in Models Without Performance Index

Variable	Fiscal 1994	Fiscal 1995
Gtbach	8.20	N/A
Award	19.55	18.03
Inzone	46.26	32.39

VI. CONCLUSIONS, AND RECOMMENDATIONS

Based on cross tabulations of data in this study, black officers have a lower selection rate than white officers for promotion to major. However, when regression analysis is performed on promotion data for fiscal year 1994 and fiscal year 1995, the effect of race on promotion is not found to be statistically significant. Factors that are found to be statistically significant include personal decorations, Performance Index, and promotion zone category. These factors are measures of an individual's performance as an officer. Nevertheless, it should be noted that the PI and awards are determined subjectively. Recommendation for a personal decoration is made by a senior officer. Performance Index is a quantitative indication of an individual's fitness report evaluation, as written by a senior officer. Promotion zone is based on the number of times an individual is considered for promotion by Headquarters, Marine Corps. Officers considered at least once and not selected are considered "above-zone."

Although there may be an advantage or reason for why certain PMOSs are mentioned in promotion board precepts, no independent effect was discovered in this analysis. In addition, other studies have determined that having a Master's degree, being in reserve status, and having one or more dependents affects an individual's odds of promotion to major in the Marine Corps. These factors were not found to have a significant effect on promotion in the present study.

The results of this analysis tend to confirm the Marine Corps' statement that promotion is based on performance. At least, the multivariate models do not find an

independent, significant effect of minority status on promotion to 0-4 for the two years studied. What appears to be of greatest importance is how one performs prior to being reviewed for promotion. Since selection for promotion is based on performance evaluation, continued work on the evaluation system and personal award process may be appropriate.

LIST OF REFERENCES

1. Long, P. F. (1992), Effect of Variables Independent of Performance on Promotion Rates to Major, Lieutenant Colonel, and Colonel in the Marine Corps, Master's Thesis, Naval Postgraduate School, Monterey, CA.

2. Estridge, D. W. (1995), A Comparative Analysis of Promotion Probabilities for Marine Corps Field Grade Officers with Special Attention Given to Graduates of the Naval Postgraduate School, Master's Thesis, Naval Postgraduate School, Monterey, CA.

3. Hamm, J. J. (1993), Different Success Rates and Associated Factors at Three Levels of Career Progression Among U.S. Marine Corps Officers, Master's Thesis, Naval Postgraduate, Monterey, CA.

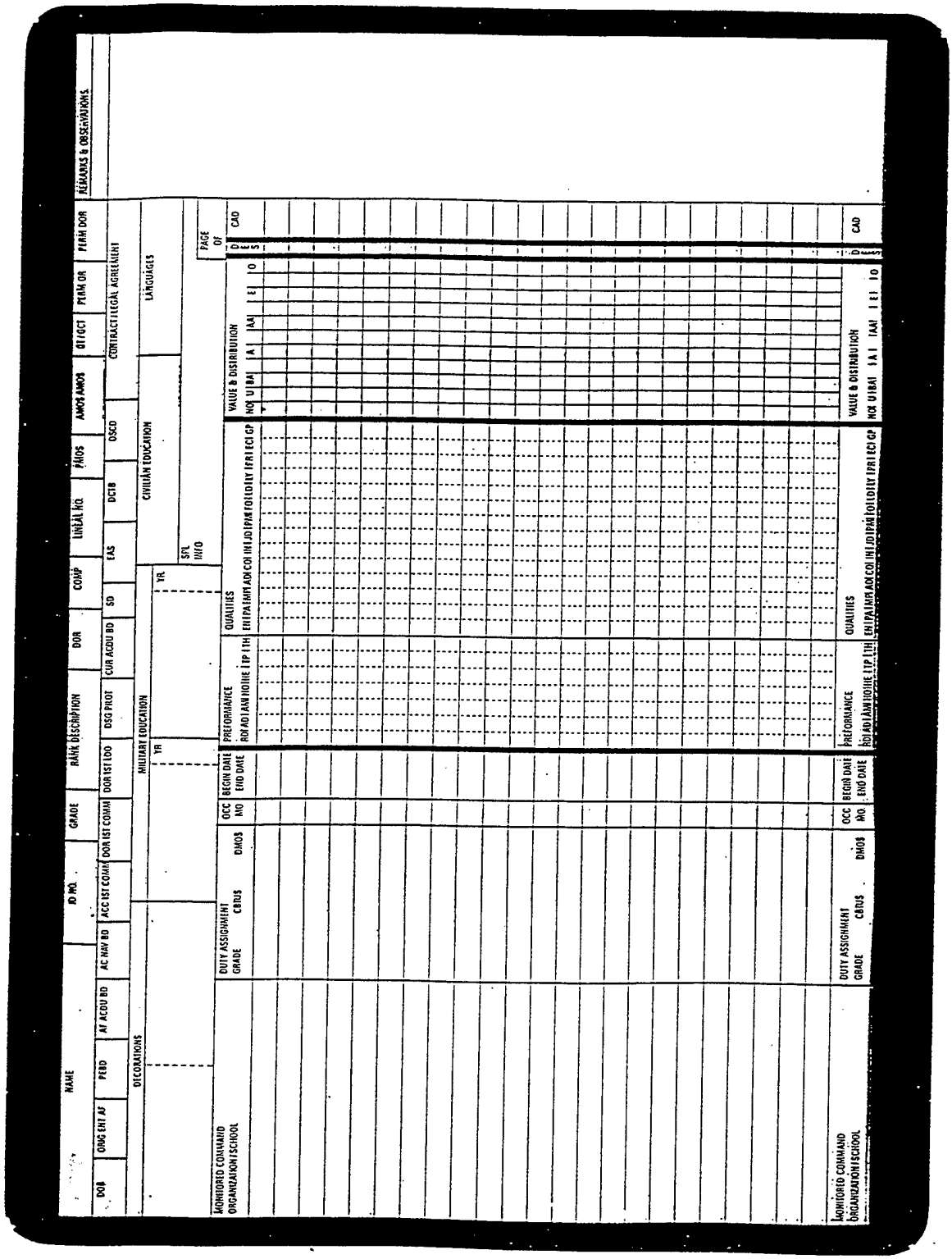
4. Harrington, D. F. (1993), "An Equal Opportunity Misconception and the Accession/Selection Paradox," Marine Corps Gazette, April, pp.38-42.

5. Secretary of the Navy, "Precept Convening a Selection Board to Recommend Officers of the Marine Corps on the Active-Duty List for Promotion to the Permanent Grade of Major," 6 January 1994.

6. Secretary of the Navy, "Precept Convening a Selection Board to Recommend Officers of the Marine Corps on the Active-Duty List for Promotion to the Permanent Grade of Major," 5 February 1993.

7. Gujarati, D. N. (1988), Basic Econometrics, 2nd ed., McGraw-Hill, Inc., p. 488.

APPENDIX A. MASTER BRIEF SHEET



APPENDIX B. USMC FITNESS REPORT

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USMC FITNESS REPORT (1610)

NAVMC 10835 (REV. 2-85)

ALIGNMENT LINE

SN: 0000 00 006 3763 U/I PG of 100

REF: MCO P1610

SECTION A. COMPLETED BY REPORTING SENIOR. (USE OCR-FONT TYPEWRITER ONLY)

PROGRAM: DFR

1. ORGANIZATION a. MCC b. RUC c. DESCRIPTIVE TITLE (Abbreviate as required)

2. MARINE REPORTED ON a. LAST NAME b. FIRST NAME c. M.I. d. GRADE e. IDENTIFICATION NO. f. PMOS g. STATUS

3. OCCASION AND PERIOD COVERED a. OCC b. PERIOD FROM-TO c. TYPE d. PERIODS OF NONAVAILABILITY (30 or more consecutive days)-EXPLAIN

4. DUTY ASSIGNMENT a. DESCRIPTIVE TITLE b. MONTHS c. T/O NO. d. LINE NO e. DuMOS

5. SPECIAL INFORMATION a. QUALIFICATION b. REVIEWING OFFICER ID NO.

6. RESERVED FOR FUTURE USE

7. RESERVED FOR FUTURE USE

8. ORGANIZED RESERVE DR ATTN. SKED.

9. DEPENDENTS REQUIRING TRANSPORTATION a. NO. b. LOCATION c. ADDRESS

10a. DUTY PREFERENCE (Code) 1st 2d 3d

10b. DUTY PREFERENCE (Descriptive Title) (Abbreviate as required) 1st 2d 3d

11. REPORTING SENIOR a. SERVICE b. GRADE c. IDENTIFICATION NO. d. NAME AND DUTY ASSIGNMENT

SECTION B. COMPLETED BY REPORTING SENIOR. USE BLACK INK AND FILL THE BOX TO INDICATE YOUR ESTIMATE OF THIS MARINE

12. SPECIAL CASE (Mark if applicable) ☐ NOT OBSERVED REPORT ☐ EXTENDED REPORT

13. PERFORMANCE

13a. REGULAR DUTIES — NO UN BA AV AA EX OS

13b. ADDITIONAL DUTIES — NO UN BA AV AA EX OS

13c. ADMINISTRATIVE DUTIES — NO UN BA AV AA EX OS

13d. HANDLING OFFICERS (MARK NCOs "NO") — NO UN BA AV AA EX OS

13e. HANDLING ENLISTED PERSONNEL — NO UN BA AV AA EX OS

13f. TRAINING PERSONNEL — NO UN BA AV AA EX OS

13g. TACTICAL HANDLING OF TROOPS — NO UN BA AV AA EX OS

14. QUALITIES

14a. ENDURANCE — NO UN BA AV AA EX OS

14b. PERSONAL APPEARANCE — NO UN BA AV AA EX OS

14c. MILITARY PRESENCE — NO UN BA AV AA EX OS

14d. ATTENTION TO DUTY — NO UN BA AV AA EX OS

14e. COOPERATION — NO UN BA AV AA EX OS

14f. INITIATIVE — NO UN BA AV AA EX OS

14g. JUDGMENT — NO UN BA AV AA EX OS

14h. PRESENCE OF MIND — NO UN BA AV AA EX OS

14i. FORCE — NO UN BA AV AA EX OS

14j. LEADERSHIP — NO UN BA AV AA EX OS

14k. LOYALTY — NO UN BA AV AA EX OS

14l. PERSONAL RELATIONS — NO UN BA AV AA EX OS

14m. ECONOMY OF MANAGEMENT — NO UN BA AV AA EX OS

14n. GROWTH POTENTIAL — NO UN BA AV AA EX OS

15a. YOUR ESTIMATE OF THIS MARINE'S "GENERAL VALUE TO THE SERVICE." — NO UN BA ☐ AV ☐ AA ☐ EX ☐ OS

15b. DISTRIBUTION OF MARKS FOR ALL MARINES OF THIS GRADE:

15c. FILL BOXES SO THAT THE SUM OF EACH COLUMN CORRESPONDS TO ITEM 15b.

1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2
4	4	4	4	4	4	4	4	4	4	4
8	8	8	8	8	8	8	8	8	8	8

16. CONSIDERING THE REQUIREMENTS OF SERVICE IN WAR, INDICATE YOUR ATTITUDE TOWARD HAVING THIS MARINE UNDER YOUR COMMAND. ☐ NOT OBSERVED ☐ PREFER NOT ☐ BE WILLING ☐ BE GLAD ☐ PARTICULARLY DESIRE

17. HAS MARINE BEEN THE SUBJECT OF ANY OF THE FOLLOWING REPORTS? IF YES, REFERENCE IN SECTION C.
a. COMMENDATORY ☐ YES ☐ NO b. ADVERSE ☐ YES ☐ NO c. DISCIPLINARY ACTION ☐ YES ☐ NO

18. REPORT BASED ON OBSERVATION ☐ DAILY ☐ FREQUENT ☐ INFREQUENT

19. QUALIFIED FOR PROMOTION ☐ NOT APPLICABLE ☐ YES ☐ NO

20. RECOMMENDATION FOR NEXT DUTY CONCUR (ITEM 10) 1 2 3 RECOMMEND A B C

21. RESERVED FOR FUTURE USE ☐ ☐ ☐ ☐ ☐

SECTION C. REPORTING SENIOR (USE TYPEWRITER)

RECORD A CONCISE APPRAISAL OF THE PROFESSIONAL CHARACTER OF MARINE REPORTED ON. THIS SPACE MUST NOT BE LEFT BLANK.

SECTION D. SIGNATURES

22. I CERTIFY the information in section A is correct to the best of my knowledge.

(Signature of Marine reported on) (Date)

23. I CERTIFY that to the best of my knowledge and belief all entries made hereon are true and without prejudice or partiality.

(Signature of Reporting Senior) (Date)

24. (Check one when required) ☐ I HAVE SEEN THIS COMPLETED REPORT AND I HAVE NO STATEMENT TO MAKE. ☐ I HAVE ATTACHED A STATEMENT

(Signature of Marine reported on) (Date)

25. REVIEWING OFFICER (Name, Grade, Service, Duty Assignment)

25a. INITIALS

25b. DATE

☐ ← STAPLE ADDITIONAL PAGES HERE

MARINE REPORTED ON (Last name) (First name) (M.I.)	GRADE	IDENTIFICATION NO.	PERIOD (From) (To)	OCCASION

REPORTING SENIOR'S CERTIFICATION

I certify that on the terminal date shown in Item 3 of Section A, I was the Reporting Senior for only those Marines of the sai grade as shown in Item 15b of Section B. Those Marines are ALPHABETICALLY LISTED below. I rank this Marine as_____ of _____(only rank Marines marked Outstanding in 15a and b; mark NA if not applicable).

NAME (Last, First, M.I.)	PMOS	NAME (Last, First, M.I.)	PMOS

SIGNATURE _____ DATE _____

REVIEWING OFFICER'S CERTIFICATION

1. ☐ I have not had sufficient opportunity to observe this Marine, so I have no comment.
2. ☐ I have had only limited opportunity to observe this Marine, but from what I have observed I generally concur with the Reporting Senior's marks in Items 15a and b.
3. ☐ I have had sufficient opportunity to observe this Marine, and concur with the Reporting Senior's marks in Items 15a anc
4. ☐ I have had sufficient opportunity to observe this Marine, and do not concur with the Reporting Senior's marks in Ite 15a and b. I would evaluate this Marine as_____(Item 15a) and rank this Marine as _____ _____(only rank those evaluated as Outstanding (OS)).

REMARKS (mandatory if Item 4. above, is checked):

SIGNATURE _____ DATE _____

NOTE: The information above WILL NOT be entered into any computer program.

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